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ACTIVITY LED LEARNING TO IMPROVE STUDENT ENGAGEMENT AND RETENTION IN A FIRST YEAR UNDERGRADUATE PROGRAMME

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Abstract *— A desire to improve the student academic experience, engagement and ultimately progression, led to the trial implementation of a six-week introductory activity-led-learning (ALL) programme. 100 students from three first year engineering courses, organised into six groups, underwent a series of six Monday – Friday exercises, each assessed on completion. A team of 16 staff delivered the programme. A student survey demonstrated a net improvement in satisfaction compared to a 2006/7 survey, and particular acclaim for 'activity', 'group work', and 'teaching methodology'. Indeed, 74% of student indicated a preference for more of this kind of learning. The exercises formed the major part of a core module for which the pass rate, provisionally, is significantly improved on the previous year. Staff identified 'enthusiasm for competitive elements' and 'attendance patterns' as notable aspects of behavioural engagement. These point to effective elements of this ALL approach that might be replicated elsewhere.*

Key words *— Activity led learning, Engagement, Engineering, Learning, Retention*

Background

The Faculty of Engineering and Computing at Coventry University is currently operating a number of initiatives to improve the student experience. This paper focuses on a six week, course based, introduction period to improve engagement and progression (and hence retention) within 3 first year undergraduate student cohorts in each of mechanical, automotive and automotive design engineering. Within this group in 2007/8, 26% failed to progress (25% due to failure and 1% due to withdrawal) from level 1 to level 2. This figure of 74% progression from stage 1 to stage 2 is set against an internal target of 80%. In a UK national study, researching reasons for non-completion among UK first year undergraduate students 'programme not what I expected', 'the way the programme was taught did not suit me', 'lack of personal engagement' and 'the amount of contact with academic staff' were 1st, equal 2nd, 4th and 5th top reasons offered by students for non-completion [1]. In an attempt to improve the situation on the above programmes, a trial six-week course introduction period was scheduled for the start of the 2008/9 academic year comprising of an intensive period of Activity Led Learning (ALL). This complements the Faculty vision commitment, to developing communities of learners through employer and profession focussed, activity led education [2].

This approach concurs with Zepke, Leach, and Prebble [3], who suggest 'a learner-centred approach, improves retention'. In this pilot the aim of the 6 week course-based introduction is to use a learner-centred, activity led approach to promote student engagement and satisfaction, thereby ultimately increasing the rate of course progression.

Following a departmental (but non-course specific) induction week, students embarked on the six-week course induction period, based on ALL. Within this, 100 students were divided into six groups maintaining Mechanical, Automotive and Automotive Design group identities. Six activity led exercises, mainly extracted from the 'Engineering Application' requirements of the course and constituting 75% of a 20-credit core module, were set up and undertaken in rotation by the students over the six-week period. The six exercises focused on Design and Build, Metrology, CAD Modelling, Materials Testing, Reverse Engineering and Product Marketing. A 16-strong mixed discipline team of academics, development officers, technicians and interns facilitated and assessed the exercise. Each activity was timetabled for 18 hours across the 5-day week and typically contained 2 or 3 hours of key note instruction, 14 or 15 hours of facilitated activity and 1 hour of assessment. Students were given their mark and feedback before departing for the weekend.

The term 'engagement', as Chapman [4] observes has been used to depict students' 'willingness to participate in activities, attending class, submitting required work, and following teachers' directions..'. Other definitions of engagement recognise the behavioural, cognitive and affective aspects of engagement [4]. The six-week programme aimed to create a strong sense of student engagement by stimulating thinking, activity, problem solving and group interaction within compact week long tasks. Incentivised by competitive elements, short deadlines and quick

feedback. Levels of engagement would be assessed through feedback from students and staff and later the completion of assessment requirements as this ultimately determines the prospects for progression. This feedback includes student satisfaction ratings as an indicator of affective and cognitive engagement with staff feedback providing indications of behavioural engagement.

Method

A review of the six-week programme was undertaken to assess outcomes and to inform future development. To assess the broad level of student satisfaction and engagement, including aspects of cognitive and affective engagement, a questionnaire was produced and targeted at the full student cohort. In addition, focus groups were operated to capture student experiences in more depth.

The questionnaire comprised closed and open questions. To enable comparison to previous student experience and satisfaction, the closed questions formed a subset of questions form a 2006/7 Coventry University student satisfaction survey. (The 2006/7 survey summarises the assessment of a sample of all three stages of all undergraduate programmes within the Department of Mechanical and Automotive Engineering, n=36). The authors selected the questions to assess student satisfaction and engagement, appropriate to its early application within the academic year. Thus as shown in appendix A, key themes explored related to course organisation and assessment, and teaching and learning which included questions related to cognitive engagement. The questionnaire was administered to all participating students in the week following the completion of the six-week programme and completed anonymously. Closed question were answered on a five point Likert scale. In keeping with the 2006/7 survey, the closed questions were analysed as means (x) and re-interpreted into a grade in the range A – E, as table 1.

Table 1
Conversion of Mean questionnaire scores to grades

Mean score range	Corresponding Grade
$X \geq 3.75$	A
$3.75 > X \geq 3.25$	B
$3.25 \geq X > 2.75$	C
$2.75 \geq X > 2.25$	D
$X \leq 2.25$	F

The open-ended responses were analysed by independent *Student Advocates (Coventry students employed part–time in administrative and/or academic support roles)* who identified the number of responses around repeated themes. The occurrence of each theme was presented as a percentage of total responses.

From the students completing the questionnaires, recruits were gathered on a voluntary basis, later forming two focus groups (8% of cohort). The key areas for exploration for the groups centred on issues arising from the questionnaires, and general areas selected by the authors to inform future development of the programme. The focus groups were run by independent Student Advocates. The discussions were tape-recorded by the advocates and afterwards transcribed by the first author who identified emerging themes.

The views of participating staff were gathered in a structured discussion led by the first author and recorded by an academic colleague. Themes emerging from the transcripts were identified and summarised by the lead author.

Ultimately, retention (measured as the proportion of students successfully progressing to stage 2) will be determined by the ongoing course assessment process, ratified at the Programme Assessment Board in July 2009 and reported thereafter.

Results

Of the 100 strong student cohort, 79% completed the questionnaire. Resultant grades are shown in Appendix A with an indication as to how the grade compared to the 2006/7 survey. Within its 38 closed questions there were 15 items of higher satisfaction, 5 items of lower satisfaction and 18 items of unchanged satisfaction compared to 2006/7 survey. Notable improvements included, a higher level of satisfaction in the 'development of common skills', specifically practical and time-management skills, and the 'usefulness of web based information'. Others included 'self confidence' and 'how you are being taught'. See appendix A for the full list of questions and analysis of responses.

The responses to the open question 'What did you like about the six-week experience?' were categorised to reveal common underlying themes. The three most highly represented themes were; 'practical experience' (34% of all respondents making a positive comment, 0% negative), 'working in a group' (23% positive, 1% negative), and 'teaching methodology' (18% positive, 1% negative).

Similarly, the three most highly represented themes from responses to the question 'How could we improve it? were; 'more break time' (11% supporting), 'increase exercise by one week to allow catch up' (9%), and 'more assessment

information' (5%). Students were also asked if they would like to see more of this type of activity, to which 74% replied 'yes', 22% 'no', and 4% 'no response'.

The student focus group focused on three areas; information and communication, structure, and teaching and learning. Respectively key points (positive as well as areas for improvement) related to: assessment guidelines and feedback, interaction with teaching staff; workload balancing, time allocations for different activities; teaching/delivery styles, catering for students with different prior experiences and backgrounds, responses to competitive/team work elements. While the three strongest themes emerging from the staff discussion related to workload balancing, role of competitive elements in engaging students, and attendance patterns. Provisionally, (pre subject assessment board) 95 % of students have passed compared to 74% confirmed by the assessment board last year (2007/8).

Analysis

Within the broad scope of opinions expressed, in questionnaires and student and staff focus groups, there was strong support for the activity-led approach and its programming. Students indicated satisfaction with areas of teaching and learning (affective engagement) and were observed by staff to have high levels of attendance and work completion (behavioural engagement). Students indicated same or improved satisfaction ratings for cognitive, personal and social skills. Good early working partnerships and relationships were formed between students and staff and students. Consequent module pass rates are significantly improved on the previous year (95% pre subject board 2008/9, 74% at subject board 2007/8) and it is hoped that this relatively early module success will inspire improved success and retention across the programme as evidenced at the forthcoming programme board.

A number of issues arose that will inform development of the programme. These generally related to organisation and structure. Compared to conventional module delivery, the ALL approach was complex and resource intensive. Most of the 16 staff involved in the delivery contributed to the independent development and preparation of the tasks. Students recognised inconsistencies in the task complexity, workload, assessment expectation, feedback and appropriateness of facilities provided. Other research also indicates that satisfaction with curriculum content, organisation, and relevance is a critical dimension of students overall satisfaction [5] and helps to explain some of the above findings especially the comments relating to task (curriculum) organisation.

It is recommended that future presentations of ALL six-week programme would benefit from development in a number of areas, namely;

1. equalisation of workload expectation between exercises
2. reduction in workload in some exercises
3. more free time within the 'working' week
4. clearer guidance in task briefs
5. clearer assessment requirements
6. improved feedback
7. smaller groups
8. accommodation appropriate to the exercise
9. increase use of competitive tasks

These improvements may be addressed firstly by enhancing the alignment [6] between learning outcomes, teaching delivery and assessment and secondly by investigating further the learning space and resource requirements for ALL.

Conclusions and recommendations

The survey indicated an increase in the level of student satisfaction within an aggregate 26% of responses to the closed questions. In open responses, student's demonstrated support for practical group work, indicating a preference for an activity led style of learning. Indeed, 74% expressing a preference for more of this type of learning (22% preferring less) provided a strong endorsement for the approach, but also areas for further investigation and development.

In providing suggestions for improvement, students focused on structural, organisational and operational issues, with no suggestions of changing the style of learning. The focus group discussions also supported this finding with many suggestions for operational change but no real criticism of the activity led approach. Staff identified improved enthusiasm for study, but also recognised that in later stages some students struggled to maintain the 'heavy' timetabling and workload demands.

To enable a 'like for like' comparison a further survey, at year-end, is needed when progression statistics will also be available to assist comparison. However preliminary results (pre subject assessment board) indicate improved level 1 to 2 progression rates. The students are now following a more conventional learning pattern and should have further valuable opinions on the merits of ALL at the end of the academic year.

The six-week activity led learning exercise was a trial for the department and will be used to inform further development within these courses, and others, within the faculty. The findings of this study will be of interest to this group and more widely to those who seek to use more learner centred and

activity led approaches to improve the student experience.

To date, key recommendations relate; firstly to aligning learning outcomes, teaching delivery and assessment more effectively to address students' feedback, and staff observations, indicating this could be improved (e.g. by considering an integrative 'cross-cutting' assignment such as a learning journal that promotes meta-cognitive engagement) and secondly, to examine learning space and resource requirements to address the sustainability concerns identified within this study such as work load/resource balancing.

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Appendix A

Student Satisfaction Survey results and comparison to 2006/7 survey